

--17. A method for identifying compounds that have the activity of modulating sister chromatid separation in plant or animal cells, comprising:

- (a) incubating with a test compound a protease, which has separin-like cysteine endopeptidase activity, in the presence of a substrate for its proteolytic activity; and
- (b) determining the modulating effect of the test compound on the proteolytic activity of the protease.

A 2 18. The method of claim 17, further comprising incubating with the test compound, a co-factor of said protease.

19. The method of claims 17-18, which is high-throughput.

20. The method of claims 17-18, wherein said protease is recombinant.

21. The method of claims 17-18, wherein said protease is a plant separin.

22. The method of claims 17-18, wherein said protease is human separin.

23. The method of claims 17-18, wherein said substrate is a protein recombinantly produced in baculovirus in the presence of a phosphatase inhibitor.

24. The method of claims 17-18, wherein said substrate is human SCC1 or a fragment or variant thereof.

25. The method of claim 24, wherein said substrate is a polypeptide with the amino acid sequence of SEQ ID NO:1, or a cleavable fragment or variant thereof.

26. The method of claims 17-18, wherein said substrate comprises a label which generates a detectable signal proportional to the amount of the cleavage product of the proteolytic activity, and wherein the signal is measured in the presence and in the absence of the test compound.

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27. The method of claim 26, wherein said label is fluorescent.

28. An inhibitor of a protease with separin-like cysteine endopeptidase activity.

29. The inhibitor of claim 28 wherein said protease is human separin.

30. A method of treatment in a human comprising administering an effective amount of the inhibitor of claim 28 to a human in need thereof.

31. The method of claim 30, wherein said treatment is cancer treatment.

32. The method of claim 30, wherein said treatment is for the prevention of birth defects caused by the mis-segregation of chromosomes in meiosis.

33. The inhibitor of claim 28, wherein said protease is a plant separin.

34. A method for increasing the ploidy of plant cells comprising administering the inhibitor of claim 33 to a plant in need thereof.